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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/075,754	02/14/2002	Anthony Petrovich	DR-338J	3391

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EXAMINER	
DEB, ANJAN K	

ART UNIT	PAPER NUMBER
2858	

DATE MAILED: 10/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/075,754	PETROVICH ET AL.	
	Examiner	Art Unit	
	Anjan K Deb	2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. This office action is in response to response with remarks filed 9-23-03.

Response to Arguments

2. Applicant's arguments regarding rejection of claims 1-6, 15-17, 21-28 and 30-32 under 35 USC 102(b) over US Pat No. 3,840,804 issued to Sauerland has been carefully considered and is found unpersuasive for the following reasons:

In response to applicant's arguments (page 3 lines 1-3) regarding independent claims 1,17 that Sauerland does not teach a phase detector responsive to output signal from sensor and input signal from the sensor please refer to Fig. 1 wherein Sauerland clearly shows a phase detector 10 responsive to output from sensor 16 and an input signal 6 from the sensor obtained from signal splitter 4. Since the source signal 2 disclosed by Sauerland is split into two signal channels 6 and 8 (similar to signal channels 76, 78 shown in Fig. 5 of the instant application) by splitter 4 (similar to coupler 74 shown in Fig. 5 of the instant application) signal channel 6 is considered the same as signal channel 8 input to sensor 16. Since the phase detector 10 disclosed by Sauerland is connected to sensor input and sensor output analogous to the connection shown in Fig. 5 of the instant application therefore Sauerland discloses a phase detector responsive to output signal from sensor and input signal from the sensor.

In response to applicant's argument (page 3 lines 4-7) regarding rejection of claims 1,17,21,31 that Sauerland does not disclose a drive circuit responsive to phase detector circuit configured to maintain a fixed phase between the input and output signal of sensor, once again

applicant's attention is drawn to Sauerland's Fig. 1 wherein Sauerland clearly shows a drive circuit (18,24,26,2) responsive to an output of phase detector 10 circuit which is configured to maintain a fixed phase (phase locking) between the input and output signal of sensor (column 4 lines 16-21). The frequency of signal source 2 (drive circuit) is voltage controlled by phase detector output voltage by a feedback circuit 26 connected to drive circuit (18,24,26,2) by switch 24 so as to maintain a fixed phase between the input (signal channel 8 from splitter 4 to sensor 16 input including transmission network 12) and output signal (signal channel 8 connected to output of sensor 16 including transmission network 12).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-8, 10-32 are rejected under 35 U.S.C. 102(b) as being anticipated by Sauerland (US 3,840,804).

Re claims 1, 17-18, 20-21, 31-32 Sauerland discloses a frequency readout circuit (Fig. 1) comprising a phase detector circuit 10 responsive to an output signal from a sensor (resonator) 16 and an input signal to the sensor 16 and a drive circuit (18,24,26,2)

responsive to phase detector and configured to maintain a fixed phase difference between input and output signal (column 4 lines 4-21).

Re claim 2, 22 Sauerland discloses maintaining a fixed phase difference (zero detector output)(column 4 lines 7-10).

Re claims 3-6, 11-13, 23-26, Sauerland discloses maintaining fixed phase difference at 90° by drive circuit (column 3 lines 12-21) and also obtain (90 + n180) degree phase shift where n is an integer. Therefore, Sauerland discloses 90°, 180°, 270°, and 360° input voltage phase shift (column 3 lines 17-20).

Re claims 7, 17, 27 Sauerland discloses phase delay adjustment by adjusting line lengths (column 3 lines 17-20).

Re claims 8, 28 Sauerland discloses producing an output voltage (44) at a predetermined frequency (assumed sinusoidal) (Fig. 4).

Re claim 15, Sauerland discloses a piezoelectric resonator broadly interpreted as a sensor having a flexure plate wave device because piezoelectric resonators are known to comprise vibrating (flexing) plates.

Re claims 16, 30 Sauerland discloses readout circuit (crystal frequency monitor) 60, which continuously outputs a resonant frequency (Fig. 5).

Re claims 10, 18, 20, 29 Sauerland discloses an adjustment apparatus 70 (Fig. 5) to offset (adjust) frequency (column 4 lines 55-68, column 5 lines 1-2) comprising a voltage step module (switch 24)(Fig. 1) and phase delay adjustment circuit by adjusting line lengths (column 3 lines 17-20). Switch 24 is a voltage step module as opening or closing of switch 24 results in a step change in voltage.

Re claims 14,19 Sauerland discloses Qeff is calculated from the ratio of offset voltage ($\Delta\theta/\Delta f$) (column 5 lines 25-35).

5. Claims 1, 18, 21, 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Rutkoski (US 4447782 A).

Re claims 1, 18, 21, 31 Rutkoski discloses a frequency readout circuit (Figure) and method comprising a phase detector circuit (36,34,50) responsive to an output signal 28 from a sensor (piezoelectric resonator B) and an input signal (12,14 have same frequency) to the sensor and a drive circuit (VCO with feedback loop C) responsive to phase detector and configured to maintain a fixed phase difference (zero) between input and output signal (column 3 lines 23-28, column 5 lines 20-25).

Re claim 18, Rutkoski discloses all of the claimed limitations as set forth above including a voltage step module 52.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 9, is rejected under 35 U.S.C. 103(a) as being unpatentable over Sauerland (US 3,840,804).

Re claim 9, Sauerland discloses all of the claimed limitations as set forth above including a circuit suitable for predetermined frequency of more than 200 MHz, which includes the range between 10 – 30 MHz.

Sauerland did not expressly disclose predetermined frequency is in the range 10 – 30 MHz.

[MPEP 2144.05 [R-1] Obviousness of Ranges: See MPEP § 2131.03 for case law pertaining to rejections based on the anticipation of ranges under 35 U.S.C. 102 and 35 U.S.C. 102/103.
I. OVERLAP OF RANGES: In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990)]

At the time of the invention it would have been obvious for one of ordinary skill in the art to modify Sauerland by adding a sensor comprising a resonator having predetermined frequency is in the range 10 – 30 MHz for accurately measuring frequency in a desired range of interest.

Conclusion

In the examiner's opinion Sauerland (also Rutkowski) disclose continuously measuring resonant frequency of a resonating circuit including a sensor (Sauerland: resonator 16) without sweeping the frequency response of the sensor by automatically adjusting the resonant frequency of the sensor including a phase detector responsive to output signal from sensor and input signal from the sensor, and a drive circuit responsive to phase detector circuit configured to maintain a fixed phase between the input and output signal of the sensor. Furthermore, Sauerland discloses resonant frequency is dependent on mass deposited on resonator electrode (Sauerland: column 4 lines 22-46) therefore the sensor may be used as mass sensor.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Anjan K. Deb whose telephone number is (703) 308-2941. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le, can be reached at (703)-308-0750.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703)-308-0956 and (703)-305-4900.

Anjan K. Deb
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9/24/03

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